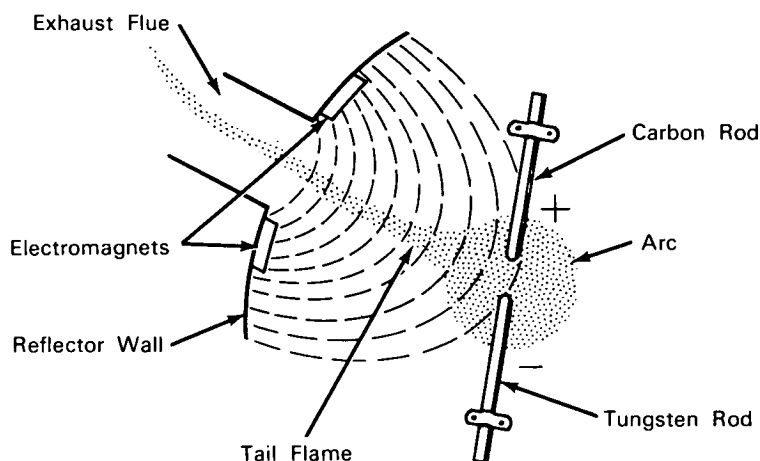


NASA TECH BRIEF



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Magnetic Field Controls Carbon Arc Tail Flame



The problem: During normal operation of carbon-arc devices, there is a heavy electron flow approaching 400 amperes from the tungsten negative to the carbon positive. The tail flame resulting from this arc must be removed by an exhaust flue. The high arc current creates a magnetic field that exerts a force on the positively charged tail flame. This has a tendency to divert the tail flame away from the exhaust flue, thus causing adjacent contamination.

The solution: A pair of matched, variable electromagnets, placed on either side of and adjacent to the exhaust flue. The polarity of these electromagnets is so arranged that they produce a magnetic field opposite in orientation to that produced by the carbon arc. This effectively cancels out the arc field and the tail flame is drawn to the exhaust flue by its air-driven suction.

How it's done: The electromagnets placed on each side of the exhaust flue produce a curved magnetic field, whose lower segment intrudes and cancels the

field produced by the arc. Since the flue has a fan-driven constant air suction, the tail flame with its products of combustion is drawn into the flue in the absence of an intervening force. In operation, the curved shape of the imposed magnetic field acts as a force component to direct the tail flame toward the center of the flue. Flexibility in this corrective device is inherent since the imposed magnetic field is readily adjusted to meet any change in the arc current component.

Notes:

1. Since the arc is started by ionization breakdown through a high voltage "kick" the electromagnetic field should not be imposed until running current occurs or the necessary starting ionization will not take place.
2. This device should appreciably reduce maintenance cycles on theater projectors, arc lamp spotlights, carbon-arc furnaces, and any arc-powered illumination devices.

(continued overleaf)

3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
P.O. Box 1537
Houston, Texas, 77001
Reference: B65-10108

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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